Mathematics 350: 3 cr. Introduction to Mathematical Biology

Prerequisites:

Math 255 or 415

Catalog Description:

Mathematical models of biological systems, differential equations

Purpose of Course:

The purpose of this course is to introduce several mathematical models for biological problems. These models will help student to do quantitative and qualitative analysis. The course will start with a general introduction of mathematical modeling on biological problems given by the instructor. Topics listed in the following will be discussed.

Text:

1. Modeling the Dynamics of Life: Calculus and Probability for Life Scientists by Frederick R. Adler
2. Modeling and simulation in medicine and the life sciences, Hoppenstadt F. and Peskin C., Springer, 2004

Topics List:

Week 1: Population dynamics: Logistic Growth Model
Week 2: Population dynamics: Lotka-Volterra Predator-Prey Model
Week 3: Spread of disease
Week 4: Competition model
Week 5: Dynamics of a Neuron
Week 6: Enzyme Kinetics

Selective Topics List:

Panting and Deep Breathing
Cancer modeling
Stochastic models of diffusion
Stochastic models of genetics
Or Topics given in the textbooks

Note: The lectures will be given by the instructor in the first six weeks. After that, part of lectures will be students' presentations. Students are expected to choose a topic from the selective list or topics given in the textbooks.

Expectation for Students:

Students are expected to choose an area of interest from this set of topics, read the related articles or chapters in the textbook, give a presentation to explain the details of the model, and write a final report. The presentation topics need to be determined by the end of fifth week. The length of presentation is 20 minutes in class after the fifth week. The page limit for the final project is 5-10 pages.

Grading Scheme:

Class presentation (10%), final report (30%) and HWs(60%)

***Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations for students with documented disabilities. http://www.ods.ohio-state.edu**

***It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term ``academic misconduct'' includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee. For additional information, see the Code of Student Conduct http://studentaffairs.osu.edu/resource_csc.asp.**